REMARKS

I. INTRODUCTION

Claims 1, 3-20, 2-36 and 38-49 are pending in this application. By this amendment claims 1, 20 and 36 are amended to more clearly define the invention and to simply issues for appeal if such appeal is necessary, and new claims 47-49 are added. Applicants respectfully submit that no new matter has been added by this amendment. Furthermore, Applicants submit that entry of the amendment is proper because it does not raise any new issues imposing additional burden on the Examiner since theses claims contain language included in originally filed claims 2, 21 and 37 and amended claims 1, 20 and 36.

II. ALLOWABLE SUBJECT MATTER

Applicants' appreciate the Examiner's indication that claims 8, 9, 18, 19, 31-33, 44 and 45 contain allowable subject matter and would be allowed if rewritten to incorporate the features of the independent claims and any intervening claims. However, for the reasons set forth herein, Applicants respectfully submit that all pending claims define patentable subject matter.

III. REJECTIONS UNDER § 102/103

Claims 1, 3, 6-18, 20, 22-31, 35, 36 and 38-43 stand rejected under 35 U.S.C. § 102(e) over U.S. Patent 6,678,310 to Andren *et al.* (hereinafter "Andren"); and claims 1, 3-18, 20, 22-31, 34-36, 38-43 and 46 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,590,889 to Preuss *et al.* (hereinafter "Preuss") in view of U.S. Patent 5,706,428 to Boer et al. (hereinafter "Boer").

i. Introduction of Traversal

Applicants respectfully submit that neither Andren nor the combination of Preuss and Boer discloses or suggests a method of wireless communication using a dual packet configuration, comprising, *inter alia*, modulating a first portion of each packet solely according to a serial modulation, and modulating a second portion of each packet according to a parallel modulation, wherein the modulating a second portion of each packet comprising modulating according to orthogonal frequency division multiplexing (OFDM), as recited in each of independent claims 1, 20 and 36.

At the outset, Applicants believe that the Examiner may not have fully considered the significance of the terms parallel and serial and more specifically, the significance of OFDM, that is, multi-tone modulation. A serial modulation is also known as a single-carrier modulation or as a single-tone modulation. The term serial implies all the data (BPSK, QPSK, QAM) modulates the envelope of the single-carrier serially in time. For example, a new QAM-symbol envelop-modulates the single carrier at the symbol rate. The prior patents cited both use single-carrier modulation. For direct sequence spread spectrum, the single-carrier is envelop-modulated with a higher-rate "chipping" sequence (CDMA).

By parallel modulation in our invention, we synonymously mean OFDM (orthogonal frequency division multiplexing), DMT (discrete multi-tone), or parallel-tone. Tone and carrier are synonymous. This type of signal is actually comprised of many single-carrier carrier signals stacked side-by-side in frequency (frequency division multiplexing). Each carrier is individually envelop-modulated. Each carrier is often spaced from the other carriers in such a way that they are orthogonal (OFDM). This means an IFFT can be used to synthesize the signal in the

transmitter, and an FFT can be used in the receiver to recover. This type of modulation is well known in the field of xDSL communications.

ii. Rejection under § 102(e) based on Andren

Andren teaches a demodulator for multipath mitigation. The Examiner states that Andren teaches (FIGS. 1A-1C) a transmitter that uses a dual packet configuration for wireless communication that comprises a first modulator that modulates a first portion of each packet (header) solely according to a serial modulation (col. 6, lines 41-51 and FIG. 1H) and a second modulator that modules a second portion of each packet solely according to a parallel modulation (col. 8, lines 37-45), wherein the parallel modulation is OFDM (col. 20, lines 32-65). Applicants disagree with this assertion.

In the Andren patent, Walsh codes are used to serially modulated a carrier. However, only one Walsh code is transmitted at a time. Nothing is transmitted in parallel, that is, nowhere in this specification is there description of a portion of a packet being modulated according to parallel modulation, i.e., OFDM, i.e., a signal comprised of many individual carriers transmitting simultaneously in parallel. This fact has been confirmed by Mark Webster, one of the inventors of this application who is also the co-inventor of the Andren/Webster patent relied upon by the Examiner.

In contrast to the Examiner's allegation, the mere mention of OFDM at col. 20, lines 32-65 in reference to way in which OFDM mitigates multipath in no way discloses or even suggests modulating a portion of a packet according to serial modulation and a portion according to parallel modulation. Thus, the rejection based on Andren under § 102 is deemed by Applicants

to be improper because each claimed element is not expressly or inherently disclosed by the reference as required under § 102.

Also, though it has been previously noted in the prosecution history that Andren does not qualify as § 103 prior art against this application because this application and Andren were subject to an obligation of common assignment at the time of the invention, Applicants submit that it would not have been obvious to modify the invention disclosed in Andren to read on the claims of the instant application. Andren is primarily concerned with mitigation of multipath effects in wireless communication systems. Andren notes at column 20 that that OFDM like other IEEE standardized signals supports some type of multipath mitigation — namely symbol duration is extended to be far greater than the multipath spread. Nothing suggests using two different modulation schemes on different portions of a packet to enable devices operating on different wireless standards to co-exist without (1) having to used the slowest data rate on the network; (2) having one standard device trying to transmit signals at the same time as another a device operating on another standard; or (3) requiring a new standard. The instant application was devised in view of the problem of serial modulation based 802.11b devices operating in the same wireless space as parallel (OFDM-based) modulated 802.11a devices. Rather than device a new standard, a novel packet and transmitter were designed. Andren does not address this problem at all. Thus, in view of the limited and context specific mention of OFDM, it would not have been obvious to teach modulating a first portion of a packet with a serial modulation scheme and a second portion according to OFDM to solve the problem of different standards coexisting in the same wireless space. There is simply no suggestion of this in Andren. Accordingly, withdrawal of the rejection based on Andren is respectfully requested.

iii. Rejection under § 103(a) based on Preuss and Boer

Regarding Preuss, the Examiner alleges that Preuss teaches a transmitter that uses a dual packet configuration (FIG. 3 and column 6) for wireless communication, comprising a first modulator that modulates a first portion of each packet (header) solely according to a serial modulation (BPSK) and a second modulator that modulates a second portion of each packet (payload) solely according to a parallel modulation (col. 4, lines 1-14). Boer is relied upon only to teach DSSS. The Examiner alleges that the use of FFT in Preuss implies OFDM. Applicants' strenuously disagree with this allegation regarding what may be implied by Preuss' mention of an FFT.

Preuss introduces the use of an FFT in col. 4, line 11 as noted by the Examiner. However, this is detailed further in col. 10, lines 34-44 and col. 16, lines 11-28. Col. 10 deals with the mathematical properties of codes that are both (1) cyclic shifts of one another and (2) orthogonal. In this case, a right multiply operation by an FFT matrix and a left multiply by an IFFT matrix can be used to diagonalize the code matrix. This property is used to create a receiver algorithm in the system of Preuss. Col. 16 lines 11-28 describe the receiver algorithm that exploits the properties in Col. 10. The receive signal is FFT'd weighted and then IFFT'd. This exploits the properties of codes that are both (1) cyclically shifted versions of one base code and (2) orthogonal. OFDM does not use codes that are cyclic shifts or one another. Rather they are harmonically related. Thus, Preuss teaches cyclically shifted codes rather than the harmonically related OFDM codes used in the claimed invention.

In addition to the fundamental differences between OFDM and cyclically-shifted codes, Preuss is devoid of any teaching of transmitting a portion of a packet according to a serial

modulation techniques and a portion according to parallel modulation technique. Like Andren, Preuss is limited to serial modulation techniques. In Preuss, one or more shifts of a cyclic orthogonal code are assigned to each terminal and theses codes are used to spread the signals for transmission rather than using separate codes. As previously noted, this reference may be characterized as teaching that a packet header may be modulated according to a different modulation technique than the packet payload. For example, the header may be modulated according to BPSK and the payload modulated with 2^m-ary QAM. This is not the same as parallel modulation, such as OFDM, where multiple carriers are each individually envelop modulated and are transmitted simultaneously. The mere fact that in the art an FFT may be used to recover OFDM or DMT signals and that Preuss teaches an FFT to *"despread and recover the received information symbols by examining all relevant phases of the cyclically orthogonal code"* does not mean that Preuss teaches modulating a portion of a packet according to serial modulation and a portion according to parallel modulation, namely OFDM. In Preuss different signals are transmitted in parallel, that is from different source terminals at the same time by allocating a particular phase of the same code to each device. This is akin to an X code division multiple access (xDMA, i.e., FDMA, TDMA, CDMA) network where a single tower needs to communicate with multiple devices in parallel at the same time. In these networks, this is done by assigning a time/frequency/code slot to each device so that the tower can discriminate among the parallel received signals. However, nowhere does Preuss even suggest modulating a first portion (header) according to a serial modulation scheme and a second portion (payload) according to the parallel modulation scheme OFDM. This type of dual mode operation would not have been obvious at the time of the invention in view of Preuss because Preuss is attempting to solve the problem of different bandwidth devices simultaneously operating through allocation

of a cyclically rotated phases of a common code, rather than devices operating on different wireless standards (serial and parallel) by a novel packet that employs serial modulation of the header and OFDM (parallel) modulation of the data payload. The fact that Preuss uses a different modulation scheme on the header than on the payload does not render his system dual mode. In fact, it single mode, in that it is only designed to be compatible with one wireless communication standard.

The dual packet configuration of the claimed invention would not have been obvious because Preuss is attempting to solve the problem of different bandwidth devices simultaneously operating through allocation of a cyclically rotated phases of a common code, rather than devices operating on different wireless standards (serial and parallel) by a novel packet that employs serial modulation of the header and OFDM (parallel) modulation of the data payload. Such a packet would not have been obvious to the person of ordinary skill in the art at the time of the invention in view of the teaching of Preuss and Boer. Accordingly, withdrawal of the rejection based on the combination of Preuss and Boer is respectfully requested.

IV. CONCLUSION

Applicants submit that this application in condition for allowance. Favorable reconsideration and prompt allowance in view of the foregoing amendments and following remarks are respectfully requested. Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

In the event any variance exists between the amount enclosed and the Patent Office charges, please charge or credit any difference to the undersigned's Deposit Account No. 50-0206.

Respectfully submitted,

HUNTON & WILLIAMS LLP

Dated: October 14, 2005

By: _____

Phillip D. Mancini
Registration No. 46,743

Kevin T. Duncan
Registration No. 41,495

Hunton & Williams LLP
Intellectual Property Department
1900 K Street, N.W.
Suite 1200
Washington, DC 20006
(202) 955-1500 (telephone)
(202) 778-2201 (facsimile)
KTD/PDM:gjc